Hacking Knowledge Management in a Time of Artificial Intelligence and Innovation Convergence

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Connect. Learn. Innovate.

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- **IMPLEMENTATION FORCE (IFOR) LOGISTICS** contributed to a map shortage in Bosnia circa 1996
 - No usable maps were available for our specific area of operations
  - Most mined area of operations!

- **SATELLITES IN SPACE WERE INTERMITTENT**
  - Precision Lightweight GPS Receiver (PLGR) was inconsistent due to Position Navigation Timing (PNT) issues

- **COLLABORATION SOLVED THE PROBLEM**
  - Drew our operations map by hand on butcher block paper with a ruler and integrated GPS grid-points
  - Leaders were amazed at ingenuity and innovation in the context of necessity
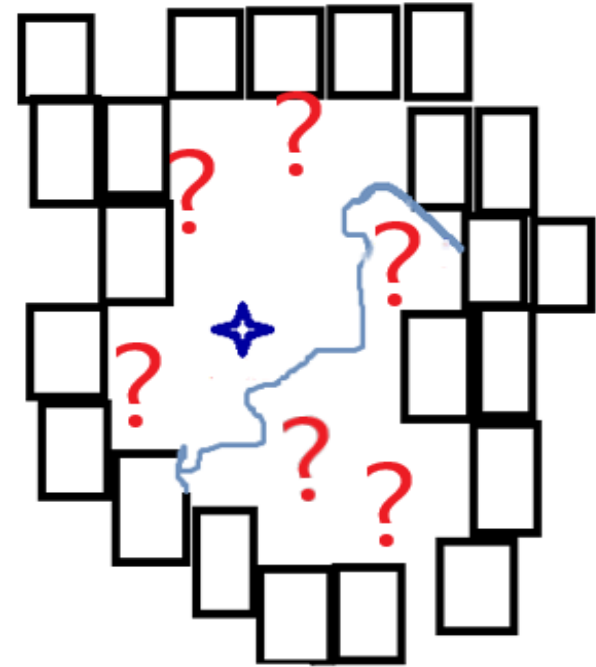
CONVERGENCE OF HUMAN KM & TECHNOLOGY = INNOVATION!

Army Modernization Efforts

IN 2017 THE ARMY ESTABLISHED 6 ARMY MODERNIZATION PRIORITIES TO FOCUS FUTURE INVESTMENTS:

- Long-Range Precision Fires
- Next Generation Combat Vehicles
- Future Vertical Lift
- Army Network
  - *Network Command, Control, Communications and Intelligence*
  - *Assured Position Navigation and Timing*
- Air and Missile Defense Capabilities
- Soldier Lethality
  - *Synthetic Training Environment*

" *"Modernizing lethality is **about capabilities, not platforms**. To be ready for the next war, the U.S. Army and the other services must **effectively innovate and adapt concepts**, equipment, and training."*

Sources: https://www.army.mil/standto/2017-10-09; https://www.army.mil/standto/2018-06-06

Enabling Modernization

ARMY FUTURES COMMAND (AFC)

AFC was established in 2018 to synchronize efforts among the Army Commands and Cross Functional Teams to advance the Army's six modernization priorities. AFC characteristics include:

- Custodian of Army modernization efforts; **linking operational concepts** to requirements… to acquisition… to fielding.

- **Bring concepts and requirements definitions together** with engineering and acquisitions functions into one team.

- Small agile headquarters **focused on flexibility, collaboration, and speed**. Focus of **faster innovation, experimentation**, and demonstration.

- Enable rapid prototyping -- failing early and cheaply, and then increase **learning** with increased operational inputs

> *Army Futures Command is **"creating multiple pilot projects to bring tech geeks in hoodies, defense contractors in suits, and soldiers in uniform"** together to innovate*

Innovation Meets Collaboration

"*"about capabilities, not platforms*"

"*linking operational concepts*"

"*Bring concepts and requirements definitions together*"

"*focused on flexibility, collaboration and speed*"

"*faster innovation, experimentation*"

"*increase learning*"

"*effectively innovate and adapt concepts*"

milSuite provides a collection of social business tools for Department of Defense (DoD) personnel that facilitates professional networking, learning, and innovation through knowledge sharing and collaboration.

milSuite Enables Innovation
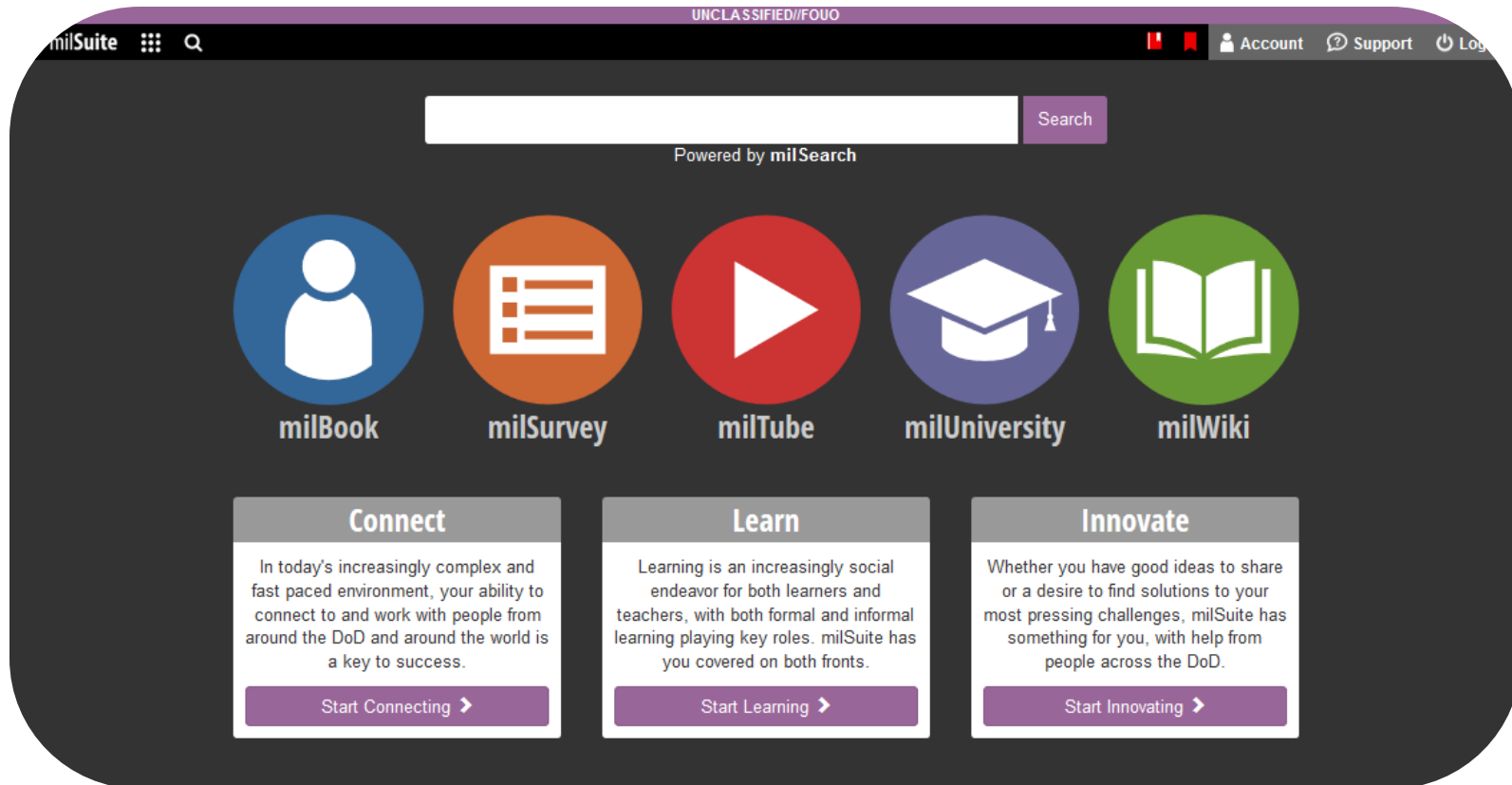
- *CONNECT* milSuite allows you to connect and work with people from across the DoD
- *LEARN* milSuite provides a learning platform for trainers and knowledge seekers
- *INNOVATE* milSuite is the home for DoD innovation where ideas make a difference

The Power of the Community

ARMY FUTURES COMMAND is creating multiple pilot projects to bring converged human collaboration on innovation together.

- The Army Applications Laboratory (AAL) is trying to bring in innovators and connect them to people in the Army with the money and authority to turn their neat ideas into reality

ARMY IDEAS FOR INNOVATION (AI2) replaced the Army Suggestion Program (ASP) suspended in 2013.

- Venue for Army Leaders, Soldiers, civilians and contractors to share innovative ideas and creative solutions that positively affect the Army through cost savings, increased productivity, and process improvement
- Hosted on milSuite AI2 is available to all DoD and Army personnel

AIR FORCE REVITALIZING THE SQUADRON officials developed a crowdsourcing / idea website to leverage knowledge and expertise from Airmen in the field.

- Airmen are encouraged to address specific topics presented in the form of challenges and to help identify the best ideas by voting, commenting and sharing
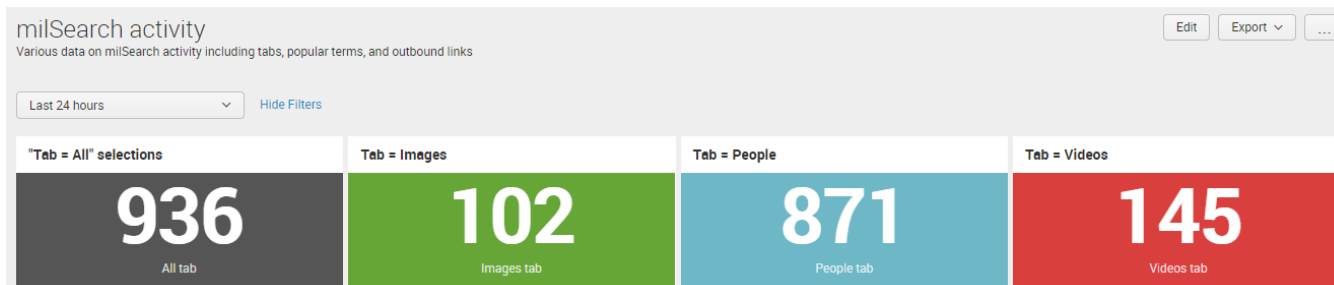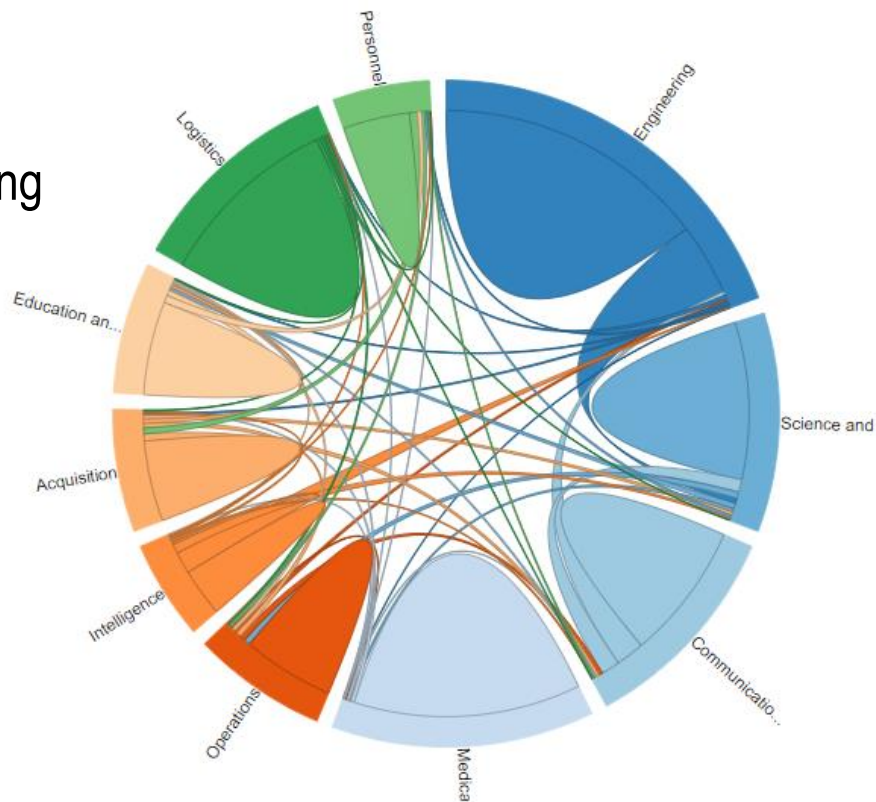- Hosted on milSuite Air Force Squadron Vitality is available to all DoD and Air Force personnel

MILSUITE – CONNECT, LEARN, INNOVATE. A collection of online applications focused on improving the methods of secure collaboration for the Department of Defense.

- U.S. Army Training and Doctrine Command's use of milWiki to create online versions of field manuals, AI2, and AFRS
- Eureka: hub to promote innovation efforts
- DoD Innovation Stream

From Knowledge to Data

- Intelligent Search
- Data mining and visualizations
- Dynamic dashboards and reporting
- milSuite Recommendations
    - *Smarter metrics on user activity*
    - *Content suggestions*
    - *Predictive analytics*

milSearch activity
Various data on milSearch activity including tabs, popular terms, and outbound links

| Last 24 hours ⌄ | Hide Filters |

"Tab = All" selections	Tab = Images	Tab = People	Tab = Videos
936	**102**	**871**	**145**
All tab	Images tab	People tab	Videos tab

Edit | Export ⌄ | ...

Beyond Data to Intelligence

" *"The Army is moving rapidly to develop and apply breakthroughs in AI [Artificial Intelligence] to impact all aspects of Army operations."*

**BG Matthew Easley
Dir. of Army Artificial Intelligence,
Army Futures Command**

" *"With AI Next, we are making multiple research investments aimed at transforming computers from specialized tools to partners in problem-solving."*

**Dr. Steven Walker
Dir. Defense Advanced Research Projects Agency (DARPA)**

*Sources: https://dod.defense.gov/News/News-Releases/News-Release-View/Article/1822975/depart%20ment-of-defense-launches-new-chief-technologist-website/;
https://www.army-technology.com/news/darpa-invest-2bn-artificial-intelligence/; https://www.cmu.edu/news/stories/archives/2018/december/army-ai-task-force.html*

Beyond Data to Intelligence

" *"In the next wave of AI Research, if we want to make more helpful and useful machines, we've got to bring back the more contextual understanding. We've got to bring knowledge abstraction and reasoning. These are the most important steps."*
Dr. Fei-Fei Li, Professor at the Computer Science Department, Stanford University

Source: MIT Technology Review 9 Oct 2017 https://www.technologyreview.com/s/609060/put-humans-at-the-center-of-ai/

- ***KNOWLEDGE ABSTRACTION*** will have new meaning and challenges as AI changes the cognitive culture of humans and vice versa

- ***HUMAN COLLABORATION*** is the center of gravity for innovation on force modernization

  GREGA: *"It is not just the Internet of Things (IoT) anymore, it is now the Internet of **Artificially Intelligent Things (IoAIT)** we have to deal with."*

Beyond Data to Intelligence

"*A year spent in artificial intelligence is enough to make one believe in God.*"
 Alan Perlis

Source: Marr, Bernard. "28 Best Quotes About Artificial Intelligence." Forbes Magazine, 25 July 2017,
https://www.forbes.com/sites/bernardmarr/2017/07/25/28-best-quotes-about-artificial-intelligence

- Where and how will the human context interject or intersect into Artificial Intelligence?

   *GREGA: "How will humans have to adapt Knowledge Management (KM) to **artificial knowledge** as AI innovates upon and within itself? Artificial Knowledge is now, or, may well be a KM context we have to converge with human KM contexts/constructs."*

AI & Knowledge Management have a history…
what does this mean for Future Collaboration?

AS A DISCIPLINE WHICH CAME FIRST AI OR KM?

ARTIFICIAL INTELLIGENCE
https://en.wikipedia.org/wiki/
Timeline_of_artificial_intelligence

KNOWLEDGE MANAGEMENT
https://en.wikipedia.org/wiki/
Knowledge_management

Future Collaboration

Knowledge managers are fond of saying "it is not the tool."

## *WHAT IF THE AI IS THE KNOWLEDGE MANAGER?*
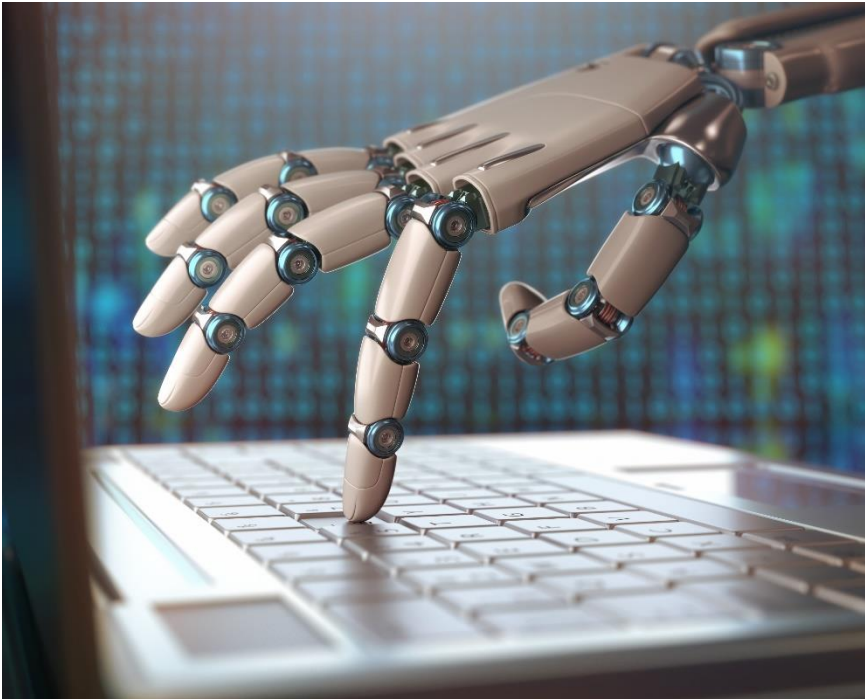
- How fast can human context be integrated **into ever faster AI?**

- Artificial Collaboration **will be the norm**

- Hacking artificially generated knowledge **is the center of gravity for future collaboration / innovation**

- Who or what will be managing **knowledge contexts**?

- How can we keep the human in it and **innovate within it**?

Hacking KM, Innovation & AI

HUMAN KM CONTEXT

- Virtual/Augmented Realities - Navy MOVES program (30 years) *https://www.navy.mil/submit/display.asp?story_id=105112*

- Virtual to Virtual Collaboration Systems Sensor Driven Big & Fast Data

- Hacking the Body - Artificial Knowledge Transhumanist Integration Exchange
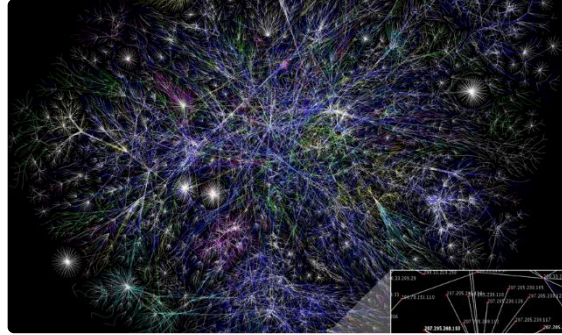
CONVERGENCE MAPPING

- Speed of Innovation! (Data Throughput to Generative Output) – Machine Learning drives the pace

- AI is the ultimate playground for AI generated innovation and KM Hacking

- Data driven machine logic shapes innovative processes - not humans
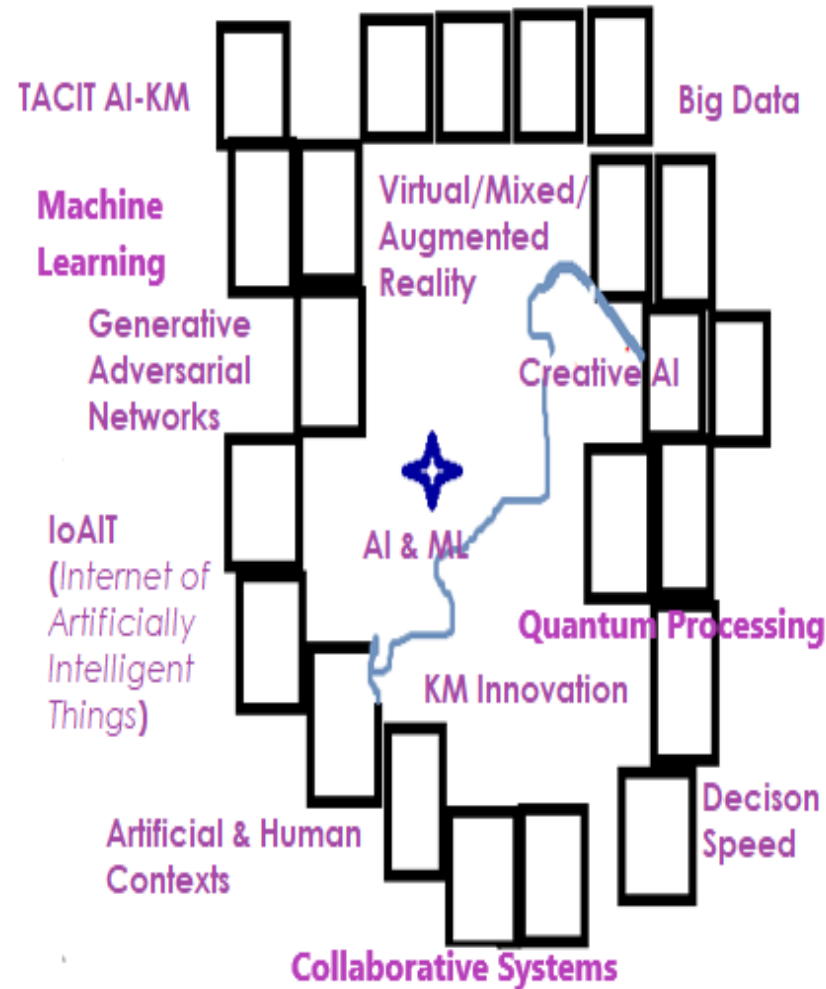
SYNTHETIC CREATIVITY ~ ARTIFICIAL GENERATION

- AI Generated Music/Art… and Thought?

- Contextual Artificial Ideation & Creative Generation ~ Holy GRAIL or Achilles' Heal?

- Facial/Bio/Techno DNA

- Quantum Blending? Humans and AI ~ HUMAI Beings ~ a combinatorial knowledge

- **Human Collaboration** fills in "knowledge map gaps"

- **The tools are changing**

- **Innovation** <u>requires</u> human collaboration

- **New contexts/frontiers are emerging** in knowledge management

KNOWLEDGE MANAGEMENT (KM) CHALLENGES!

- KM must innovate with or without the tool

- KM has no choice but to comply as a derivative discipline

- Collaborative innovation efforts are the penultimate KM proving ground

TACIT AI-KM

Big Data

Machine Learning

Virtual/Mixed/Augmented Reality

Generative Adversarial Networks

Creative AI

IoAIT (Internet of Artificially Intelligent Things)

AI & ML

Quantum Processing

KM Innovation

Artificial & Human Contexts

Decison Speed

Collaborative Systems

Near Peer AI-KM: Further Reading milSuite

- The New Arms Race Threatening To Explode in Space by Garrett M. Graff Wired Magazine
  https://www.wired.com/story/new-arms-race-threatening-to-explode-in-space/

- NSA Releases the Dragon April 8, 2019 (AFCEA) by Maryann Lawlor
  https://www.afcea.org/content/nsa-releases-dragon

- Intel Community CIO Calls for Urgency March 5, 2019 Kimberly Underwood
  https://www.afcea.org/content/intel-community-cio-calls-urgency

- DoD Rips Wrapping off of New Joint AI Center February 13, 2019 by Jason Miller
  https://federalnewsnetwork.com/artificial-intelligence/2019/02/dod-rips-wrapping-paper-off-of-new-joint-ai-center/

- Air Force Looks to Field 'Skyborg" AI concept by 2023 by Vivienne Machi March 29, 2019
  https://www.rotorandwing.com/2019/03/29/air-force-looks-field-skyborg-ai-concept-2023/

- 568 Balls in the Air: Planning for the Loss of Space Capabilities by Chadwick D Igl, Candy S. Smith, Daniel R. Fowler, William L. Angermann Joint Force Quarterly 90
  https://www.ndu.edu/News/Article-View/Article/1668457/568-balls-in-the-air-planning-for-the-loss-of-space-capabilities/

Creative AI: Further Reading

- Artificial Intelligence & Art – Can Machines be Creative? Digital Artworks show they can.
  https://www.scmp.com/magazines/post-magazine/arts-music/article/2169123/artificial-intelligence-and-art-can-machines-be

- How AI-Generated Music Is changing The Way Hits Are Made (The Verge)
  https://www.scmp.com/magazines/post-magazine/arts-music/article/2169123/artificial-intelligence-and-art-can-machines-be

- For AI to Get Creative, It Must Learn the Rules – Then How to Break 'Em; The Atlantic
  Chris Baraniuk
  https://www.scientificamerican.com/article/for-ai-to-get-creative-it-must-learn-the-rules-mdash-then-how-to-break-lsquo-em/

- Guzman, Sanzogni, Bush – Artificial Intelligence and Knowledge Management:
  Questioning the Tacit Dimension
  https://www.researchgate.net/publication/319437422_Artificial_intelligence_and_knowledge_management_questioning_the_tacit_dimension

Latest Guidelines on Ethical AI

milSuite

- US DOD AI Strategy Guidance:
  - *https://media.defense.gov/2019/Feb/12/2002088963/-1/-1/1/SUMMARY-OF-DOD-AI-STRATEGY.PDF*

- EU recently adopted some guidelines:
  - *https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai*
  - *https://ec.europa.eu/futurium/en/ai-alliance-consultation/guidelines#Top*

- US DOD - Defense Innovation Board AI Recommendations:
  - *https://innovation.defense.gov/ai/*

- UNESCO – Focus on AI Ethics:
  - *https://en.unesco.org/courier/2018-3/towards-global-code-ethics-artificial-intelligence-research*

References / Links

- IFOR
  https://en.wikipedia.org/wiki/Implementation_Force

- IFOR Bosnia-Herzegovina Image
  https://en.wikipedia.org/wiki/Implementation_Force#/media/File:IFOR_map_split.jpg

- IFOR Logistics - Getting There Was Part of the Battle Part I and II

  - *https://www.army.mil/article/120902/getting_there_was_the_battle_part_i*

  - *https://www.army.mil/article/124997/getting_there_was_the_battle_part_ii*

- Royalty free cool purple/blue egg image courtesy of pixabay. Image by KreativeHexenkueche
  https://pixabay.com/users/KreativeHexenkueche-8926 or
  https://pixabay.com/illustrations/easter-spring-easter-egg-blue-2038263/

- Wikipedia/Wikimedia used for several images.

- Some references/sources are cited directly in slides.
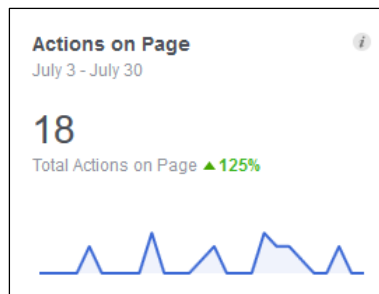
Questions & Answers

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